PROCESS FOR THE PRODUCTION OF RADIOACTIVE COBALT.

The invention concerns a process which makes it possible to separate radioactive cobalt from the bulk of the cobalt contained in a cobalt compound from which the radioactive cobalt is produced by exposing the said cobalt compound to a neutron radiation.

A radioactive element of a long half life period is produced from cobalt by slow neutrons as first reported by Sampson, Ridenour and Bleakney, Phys. Rev. 50, 382, (1936). This radioactive cobalt has valuable properties from the medical point of view. Being an isotop of cobalt it cannot be separated chemically from irradiated cobalt element or cobalt compounds such as cobalt oxide. Yet a chemical concentration of the radioactive cobalt is required both from the point of view of application and from the point of view of production.

An efficient production of radioactive cobalt is possible if radioactive cobalt can be separated from a cobalt compound which is dissolved in a hydrogen containing solvent and a large bulk of the solution is exposed to a neutron source. The neutrons must pass a sufficiently thick layer of the solvent to be slowed down by the solvent and captured by the dissolved cobalt. In this way almost all the neutrons can be slowed down and utilised for the production of radioactive cobalt. The radioactive cobalt is, however, if produced in this way, contained in a fairly large amount of non radioactive cobalt. In order to utilise the radioactive cobalt a separation from the bulk of the non radioactive cobalt is essential.

According to the invention on radioactive cobalt is produced and chemically concentrated by irrddiating cobalt nitrosotricarbony ($Co(CO)_3NO$) with neutrons and removing after irradiation the cobalt freed from this compound. The cobalt thus removed contains radioactive cobalt in highly concentrated form. It is advisable to shield the compound ruring irradiation from X Rays, if the neutron source used has a high X Ray intensity.

One way of removing the freed cobalt from the compound is the following. A small amount of an oxidizing agent, such as for instance iodine, is dessolved either in water or in the cobalt compound. The cobalt compound is after irradiation shaken with water, the freed cobalt is oxidized, for instance to cobalt iodide, and the cobalt salt is taken up by the water, which - if necessary - may contain compounds which keep the cobalt salt in solution, by forming a complex salt.

Another way of removing the freed cobalt from the said compound after irradiation is to shake the said compound with some colloidal cobalt and then to precipitate the colloidal cobalt.

These methods of separation of the freed cobalt which contains a high percentage of the radioactive cobalt work equally well, if the cobalt-nitrosotricarbonyl is kept dissolved in a hydrogen containing compound, for instance in a hydrocarbon during irradiation.

C L A I M S

1) Method for the production of radioactive cobalt consisting in the irradiation og a cobaltcarbonyl compound with neutrons and the separation of the cobalt which has been freed from this compound during the said irradiation.

2) Method for the production of radioactive cobalt consisting in the irradiation of cobaltnitrosotricarbonyl with neutrons and the separation of the cobalt which has been freed from cobaltnitrosotricarbonyl during the said irradiation.

3) Method for the production of radioactive cobalt consisting in the irradiation of a hydrocarbon which contains dissolved cobaltnitrosotricarbonyl with neutrons and the separation of the cobalt which has been freed from cobaltnitrosotricarbonyl during said irradiation.

4) Method according to claim 2) or 3) the said separation being effected by shaking after irradiation the cobaltnitrosotricarbonyl or its solution with a watery solution of chemicals or pure water, whereby the watery phase takes up the freed cobalt in the form of a cobalt salt.